Canola Root Growth and Development

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Canola

- Plant Phenotyping and Imaging Research Centre (P^2IRC)

- Help crop breeders identify characteristics that improve crop yield

Objectives

- determine the allocation of root biomass relative to shoot biomass

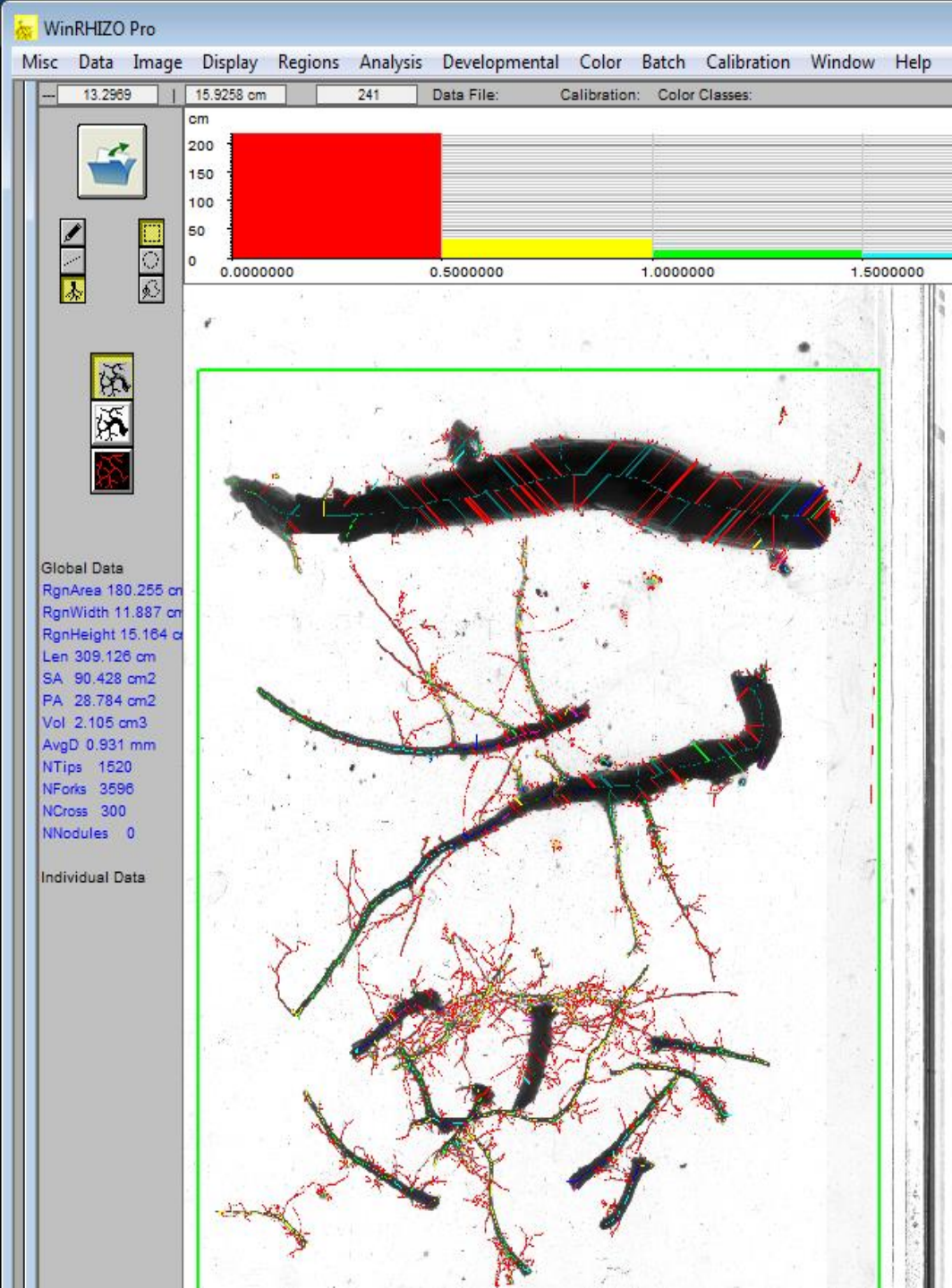
- determine root morphology over the growing season of sixteen different canola varieties

Experimental Design

- 16 canola varieties
- 3 replicates
- 10 weeks

Sampling Procedure

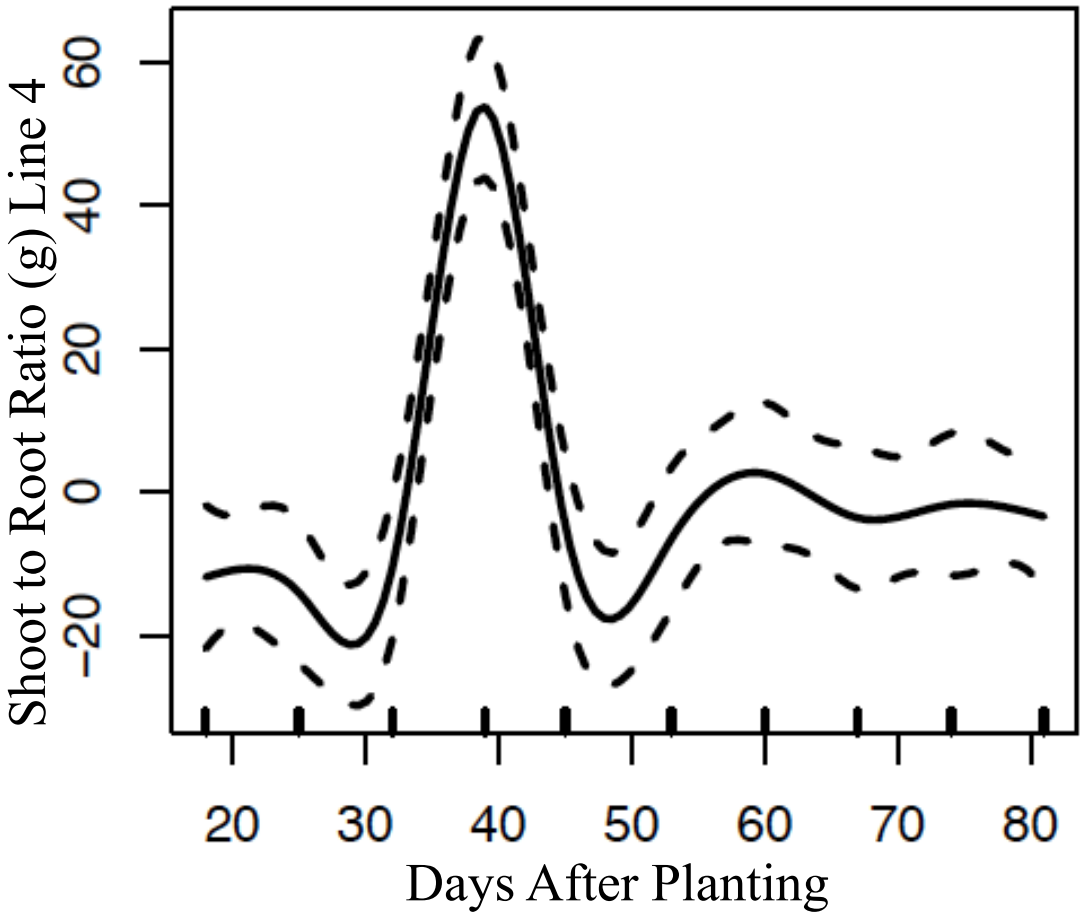
- Cut at crown
- Root core
- Cores washed and scanned
- Shoot and root biomass dried and weighed


WinRHIZO Pro
Misc Data Image Display Regions Analysis Developmental Color Batch Calibration Window Help
13.2969
15.9258 cm
241
Data File:
Calibration:
Color Classes:
cm
200
150
100
50
0
0.0000000
0.5000000
1.0000000
1.5000000
2.0000000
2.5000000
3.0000000
Global Data
RgnArea 180.255 cm
RgnWidth 11.887 cm
RgnHeight 15.164 cm
Len 309.126 cm
SA 90.428 cm2
PA 28.784 cm2
Vol 2.105 cm3
AvgD 0.931 mm
NTips 1520
NForks 3596
NCross 300
NNodules 0
Individual Data

WinRHIZO

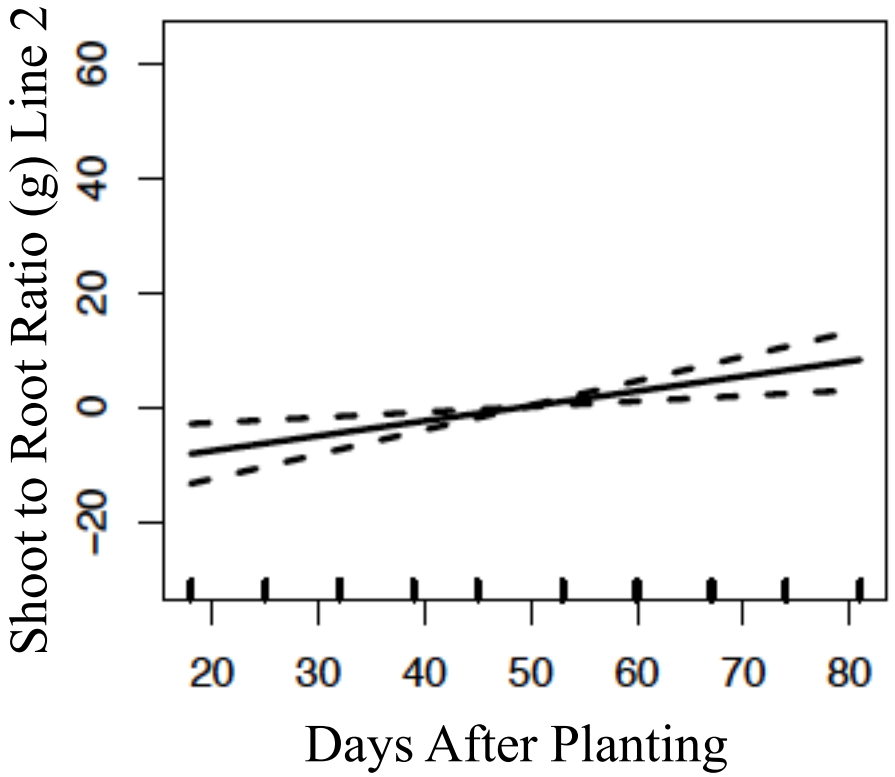
Shoot to Root Ratio

- Line 4 had a period of high shoot growth
- Other varieties had more shoot growth than root growth

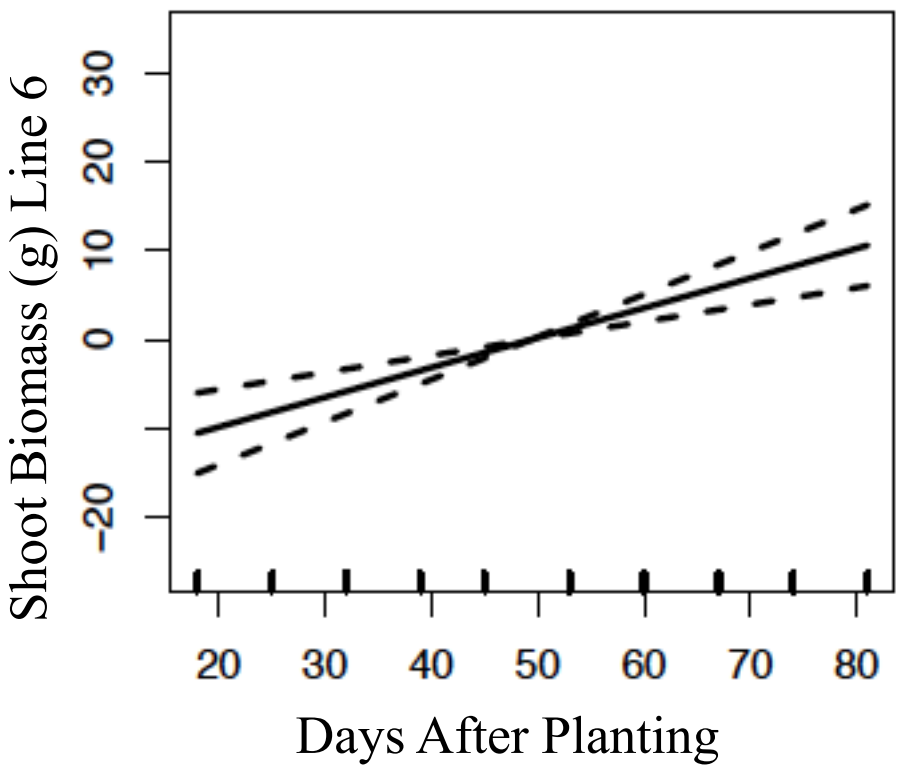


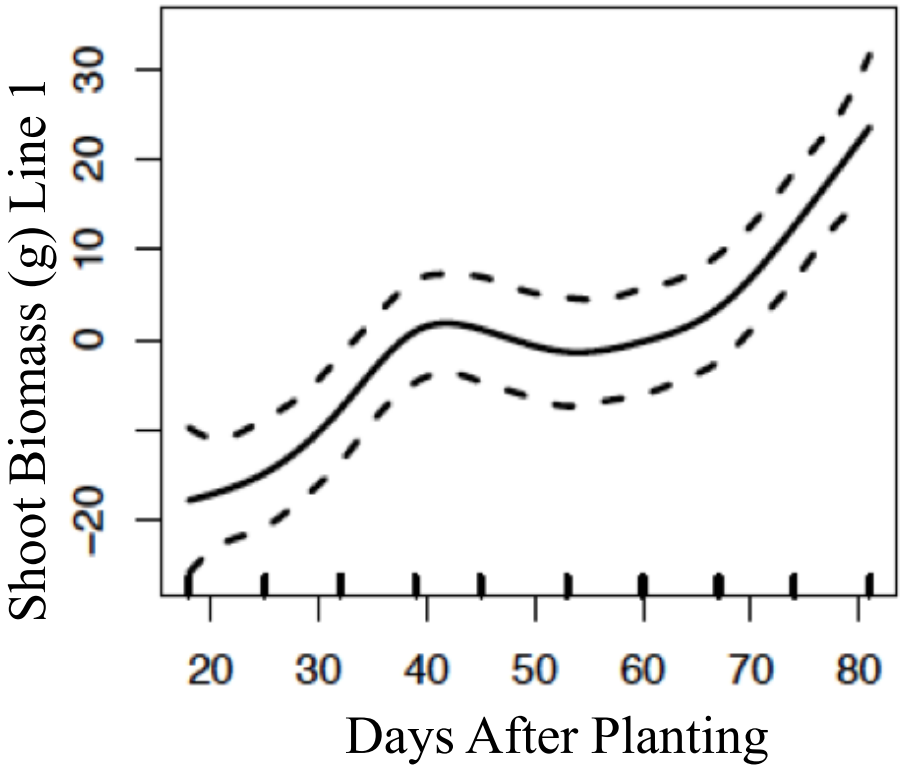
Shoot to Root Ratio

- Line 2 had more shoot growth than root growth throughout the growing season



Shoot Biomass



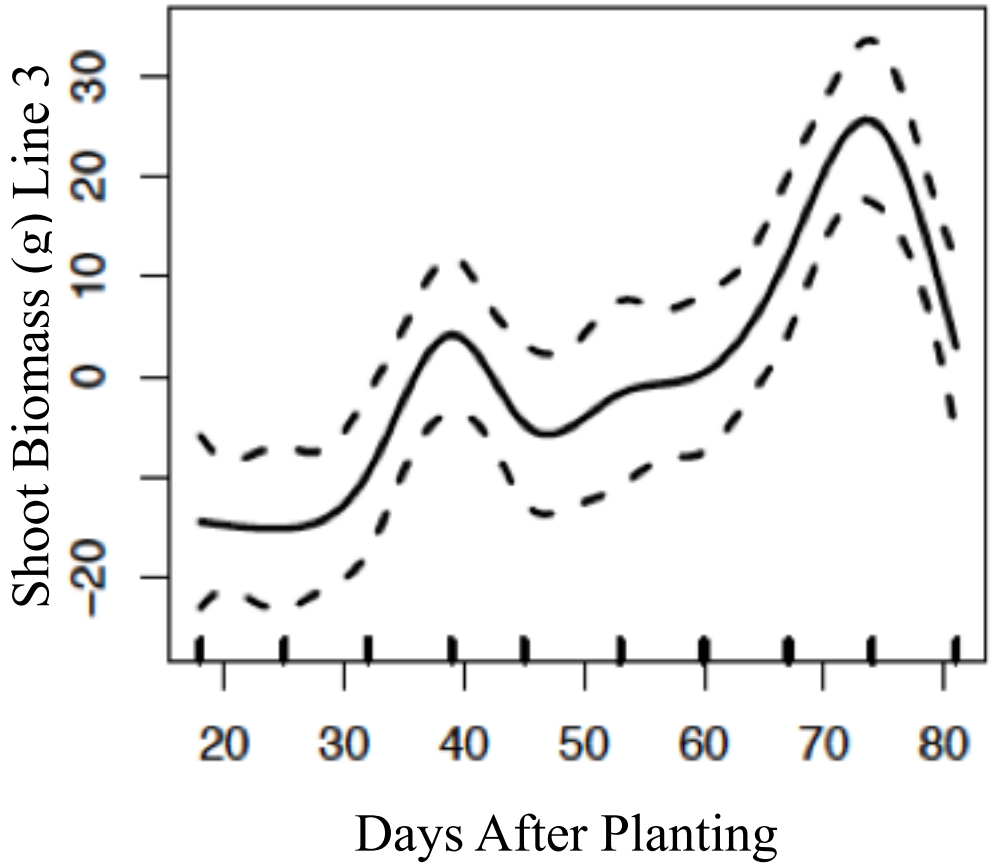


- All varieties had a significant increase in shoot biomass over the growing season

- Shoot biomass either was linear or decreased at the end of the growing season

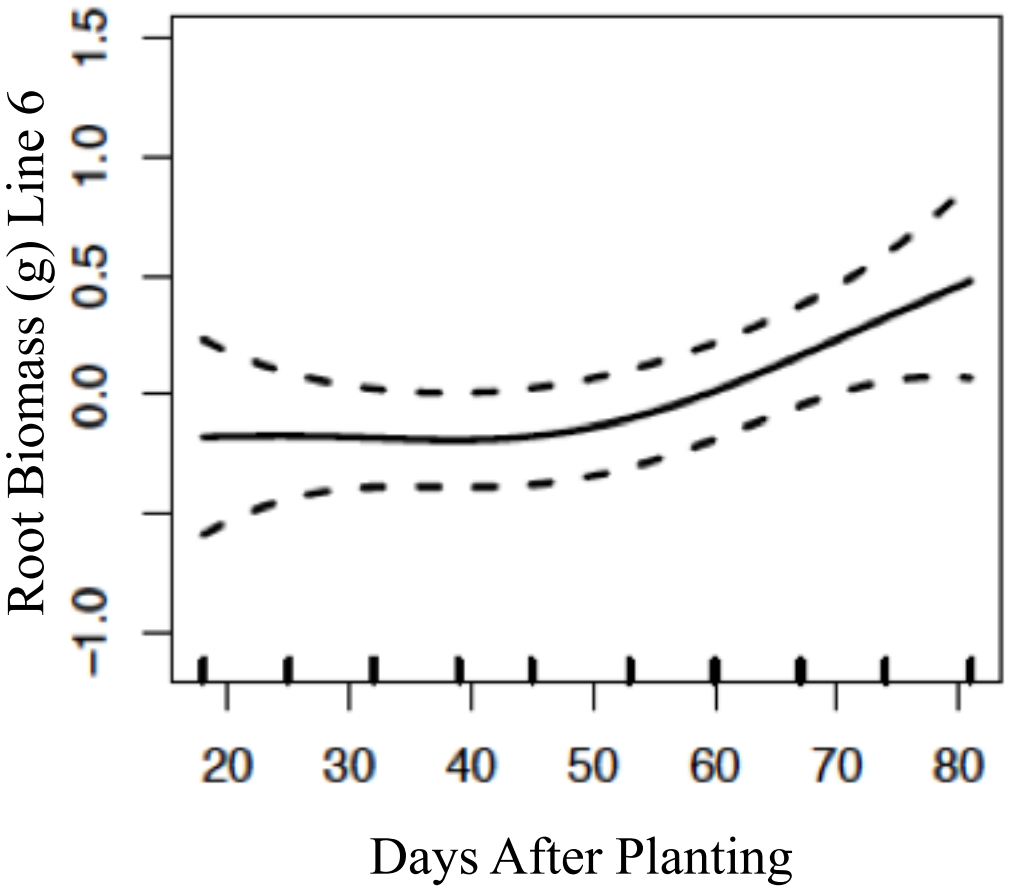
Shoot Biomass

- Line 3 increased and decreased throughout the growing season
- Leaves are senescing at the end of the growing season



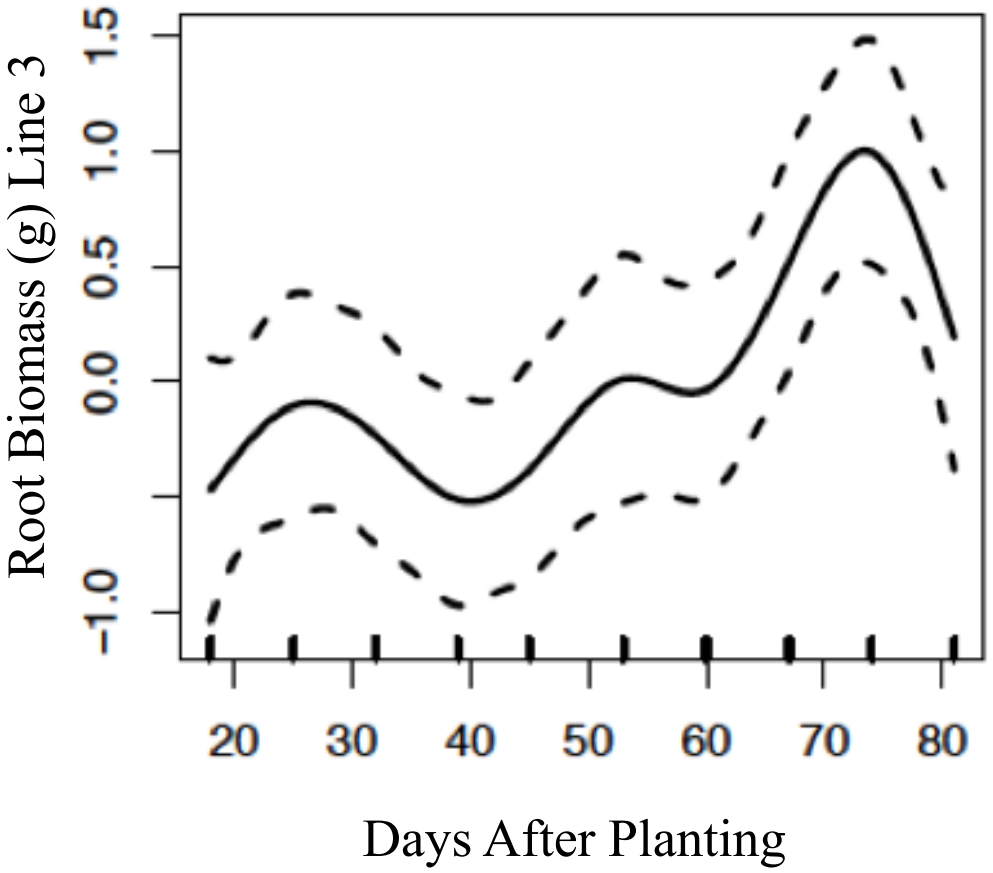
Root Biomass

- Line 6 did not significantly increase in root biomass
- 12 varieties had a significant increase in root biomass over the growing season

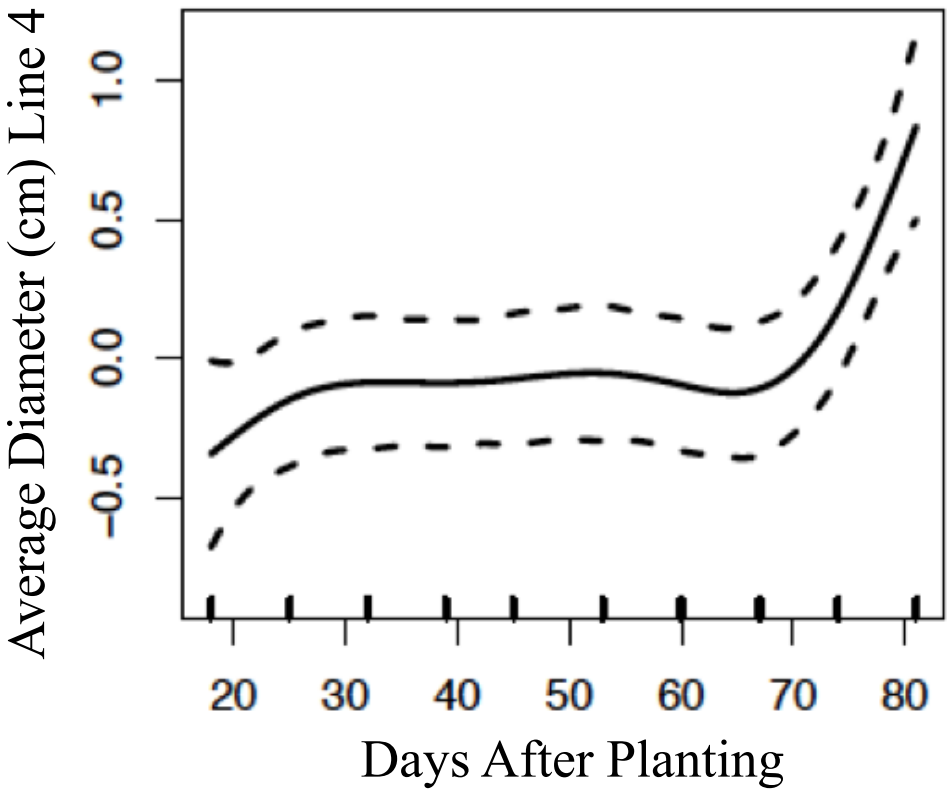


Root Biomass

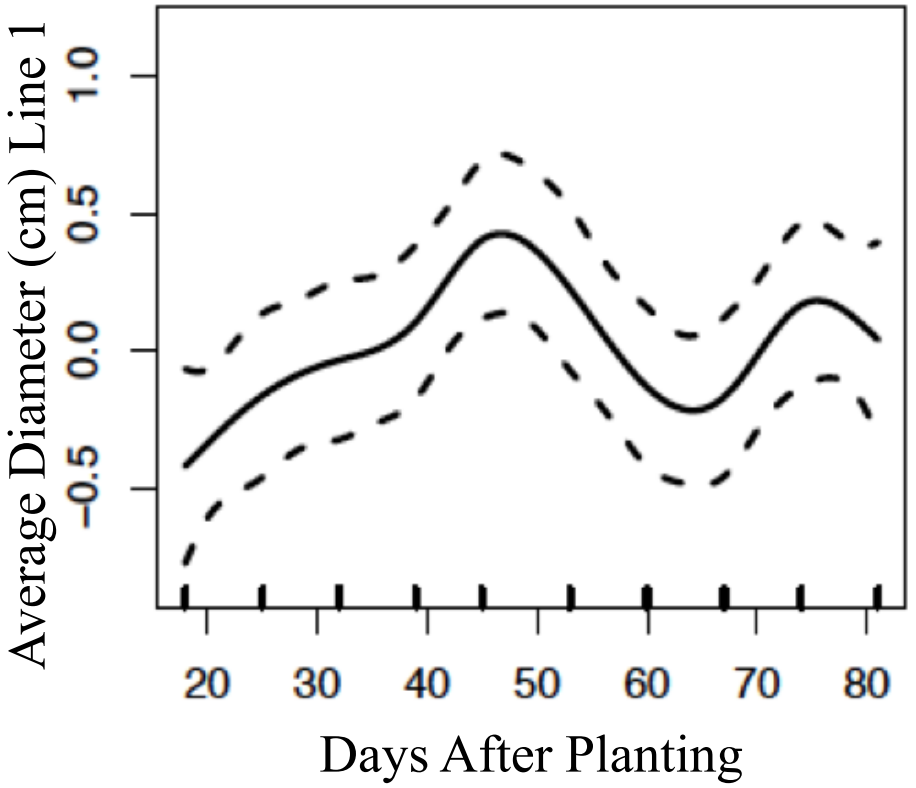
- Line 3 increased and decreased throughout the growing season
- Fine roots were dying off at the end of the growing season



Average Root Diameter

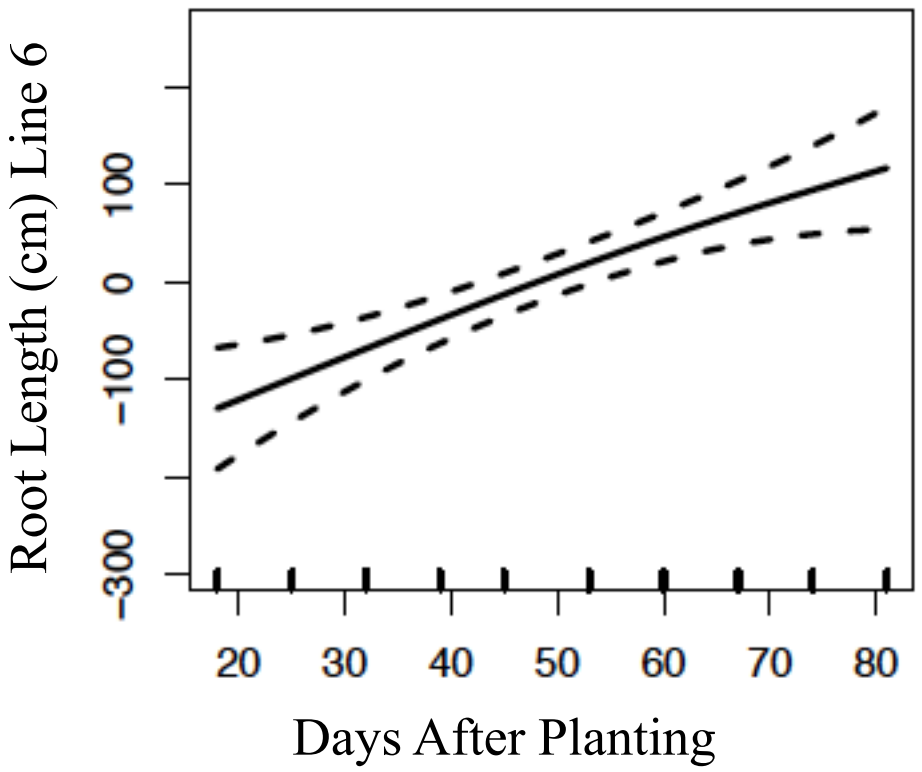


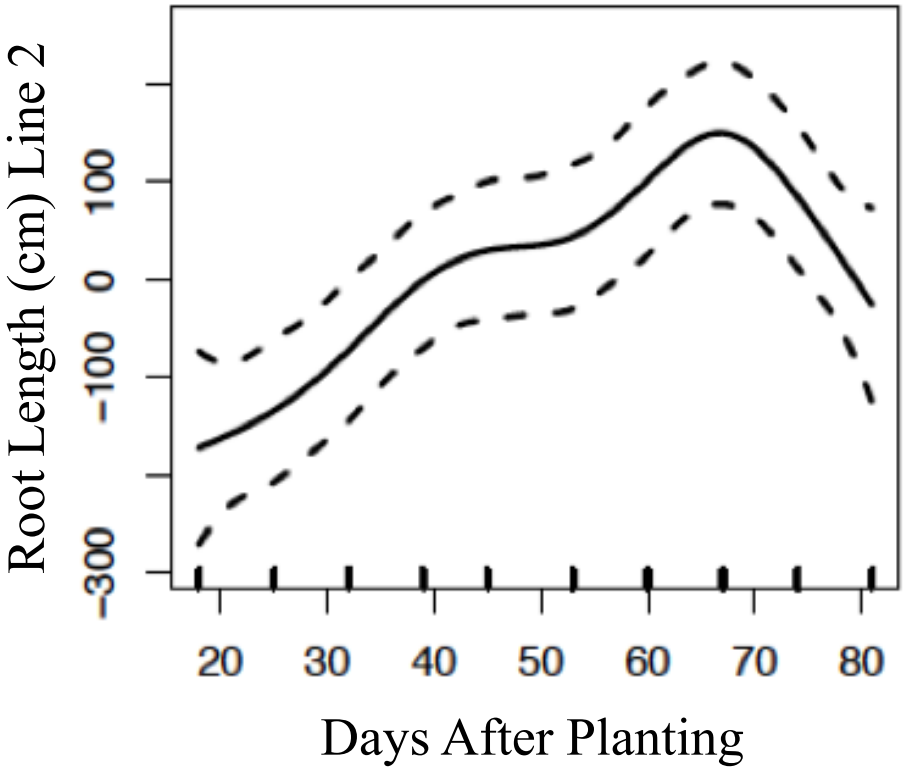
- Line 4 increased in average diameter instead of using stored vegetative proteins



- Line 1 used stored vegetative proteins at the end of the growing season

Root Length





- Line 6 increase root length throughout the growing season
- Line 2 had fine roots die off at the end of the growing season

Conclusion

- Shoot biomass increased at a higher rate than root biomass throughout the growing season
- Line 1 and 2 had the highest shoot biomass, high average root diameter, high root length, and high root biomass
- Line 5 and 6 had a lower shoot biomass and had no significant increase in root biomass and average diameter

Acknowledgements

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Questions?